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GGSIPU mathmatics 2009

1. If $A(z_1)$, $B(z_2)$, $C(z_3)$ and $P(z)$ represents complex numbers such that

$$^0 z_1 - z^0 = ^0 z_2 - z^0 = ^0 z_3 - z^0$$, then A,B,C lies on

(a) A straight line
(b) A circle
(c) A parabola
(d) An ellipse

2. if the complex numbers z_1,z_2 and origin form vertices of an equilateral triangle,then the value of $z_1^2 + z^2_2$

(a) z_1z_2 (b) z_1+z_2

(c) $2z_1z_2$ (d) z_1-z_2

3. Three numbers form an increasing GP.If the middle term is doubled, then the new numbers are in AP.The common ratio of the GP will be

(a) $2 - \sqrt{3}$ (b) $2 \pm \sqrt{3}$

(c) $3\sqrt{2}$ (d) $3+\sqrt{2}$

4. If the equations $ax^2+2cx+b=0$ and $ax^2+2bx+c= 0$, (b≠ c) have a common root, then the value of a+4b+4c will be

(a) -2 (b) 1

(c) -1 (d) None of these

5. If one root of $ax^2+bx+c = 0$ as twice the other root, then

(a) $b^2 = 9ac$ (b) $2b^2 = 9ac$

(c) $2b^2 = ac$ (d) $b^2 = ac$

6. The number of ways of distributing 8 distinct toys among 5 children will be

(a) 5^8 (b) 8^5

(c) 8_{p_5} (d) 40

7. The value of $C_1 - 2.C_2 + 3.C_3 - 4.C_4 + ...$ Where $C_r = n_{C_r}$ will be

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(a) -1 (b) 1

(c) 0 (d) None of these

8. If the equations

$2x-y+2z = 2$

$x-2y+z = -4$

$x+y+^{a}z = 4$

have no solution, then the value of ^{a} will be

(a) 1 (b) 2

(c) 3 (d) -4

9. If $A = \begin{bmatrix} a & 0 \\ 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then the value of ~, if $A^2=B$ will be

(a) 4 (b) 3

(c) 5 (d) None of these

10. The probability that at least one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then $P(\bar{A}) + P(\bar{B})$ will be

(a) 1.5 (b) 1.3 (c) 1.2 (d) 0.8

11. If $\sin(\sin^{-1}\frac{1}{5} + \cos^{-1} x) = 1$, then x is

(a) $\frac{1}{5}$ (b) $\frac{2}{5}$

(c) $\frac{3}{5}$ (d) $\frac{\pi}{2}$

12. The value of $\tan\left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ will be

(a) $\frac{6}{11}$ (b) $\frac{6}{17}$

(c) $\frac{11}{6}$ (d) $\frac{17}{6}$

13. In a ΔABC, if $\tan\frac{A}{2} = \frac{5}{6}$ and $\tan\frac{C}{2} = \frac{2}{5}$, then the sides a,b,c are in

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(a) AP (b) GP

(c) HP (d) None of these

14. The value of

$\cos\left(\frac{\pi}{5}\right)\cos\left(\frac{2\pi}{5}\right)\cos\left(\frac{4\pi}{5}\right)\cos\left(\frac{8\pi}{5}\right)$ will be

(a) $\frac{1}{16}$ (b) $-\frac{1}{16}$

(c) 0 (d) $\frac{1}{2}$

15. The distance between the lines 3x+8y = 15 will be

(a) $\frac{3}{2}$ (b) $\frac{3}{8}$

(c) $\frac{3}{10}$ (d) 6

16. If the algebraic sum of the perpendicular distances from the points (2,0),(0,2) and (1,1) on a variable line is zero ,then the line will pass through the fixed point

(a) (1,2) (b) a straight line

(c) (0,0) (d) (2,1)

17. The locus of the point of intersection of the lines x cos~ + y sin~ = p and x sin ~ - y cos~ = q (~ is a variable) will be

(a) a circle (b) a straight line

(c) a parabola (d) an ellipse

18. The locus of the mid points of the chords of a circle which subtend a right angle at its centre (equation of the circle is $x^2+y^2 = a^2$) will be

(a) $x^2+y^2= 3a^2$ (b) $x^2+y^2=\frac{a^2}{3}$

(c) $2(x^2+y^2)= a^2$ (c) $4(x^2+y^2)= a^2$

19. If the line 3x-2y+p = 0 is normal to the circle x^2+y^2 = 2x-4y-1,then p will be

(a) -5 (b) 7

(b) -7 (d) 5

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20. If the two circles $x^2+y^2-10x+16 = 0$ intersect at two ral points, then

(a) $1<r<7$ (b) $3<r<10$

(c) $2<r<9$ (d) $2<r<8$

21. The equation of the tangent to the parabolas $y^2= 2x$ and $x^2=16y$ will be

(a) $x+y+2=0$ (b) $x-3y+1=0$

(c) $x+2y-2 = 0$ (d) $x+2y+2 = 0$

22. The equation of the tangent to the parabola $y^2 = 8x$, which is parallel to the line $2x-y+7=0$,will be

(a) $y=x+1$ (b) $y=2x+1$

(b) $y = 3x+1$ (d) $y = 4x+1$

23. The distance of a point on ellipse $\frac{x^2}{6}+\frac{y^2}{2}= 1$ from its centre is 2. The eccentric is $\sqrt{2}$ angle of the point will be

(a) $\frac{\pi}{4}$ or $\frac{\pi}{3}$ (b) $\frac{\pi}{3}$ or $\frac{3\pi}{5}$

(c) $\frac{\pi}{4}$ or $\frac{3\pi}{4}$ (d) None of these

24. The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$.Its equation will be

(a) $x^2-y^2= 1$ (b) $x^2-y^2=20$

(c) $x^2-y^2= 4$ (d) $x^2-y^2=32$

25. The vector of magnitude 9 unit perpencular to the vectors $4\hat{i} - \hat{j} +3\hat{k}$ and $-2\hat{i} + \hat{j} - 2\hat{k}$ will be

(a) $3\hat{i} + 6\hat{j} -6\hat{k}$ (b) $-3\hat{i} + 6\hat{j} +6\hat{k}$

(c) $3\hat{i} -5\hat{j} +5\hat{k}$ (d) $3\hat{i}+ 6\hat{j} +6\hat{k}$

26. If $\vec{a}\times\vec{b} = \vec{c} \times \vec{b} \div \vec{b}$, then $\vec{a} - \vec{c}$ will be equal to

(a) $k\vec{b}$ (b) $k\vec{a}$

(c) $k\vec{c}$ (d) $k(\vec{a}+\vec{b})$

27. The value of of 'a' so that the vectors $\hat{i}-3\hat{j}+\hat{k}$, $2\hat{i}+\lambda\hat{j}+\hat{k}$ and $3\hat{i}+\hat{j}-2\hat{k}$ are coplanar, will be

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(a) 0 (c) 2

(c) $-\frac{1}{2}$ (d) -4

28. The line passing through the point (-1, 2, 3) and perpendicular to the plane x-2y+3z+5 = 0 will be

(a) $\frac{x+1}{1}=\frac{y-2}{3}=\frac{z-3}{5}$

(b) $\frac{x+1}{1}=\frac{y-2}{3}=\frac{z+3}{3}$

(c) $\frac{x+1}{1}=\frac{y-2}{3}=\frac{z-3}{2}$

(d) $\frac{x+1}{1}=\frac{y-2}{-2}=\frac{z-3}{3}$

29. The value of k, if the line $\frac{x-4}{1}=\frac{y-2}{1}=\frac{z-k}{1}$ lies on the plane 2x-4y+z = 7, will be

(a) 5 (b) 7

(c) 9 (d) 11

30. If the line of intersection of the planes 2x+3y+z=1 and x+3y+2z = 2makes angle ~ with positive direction of x-axis , then cos~ will be equal to

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{\sqrt{5}}$

(c) $\frac{1}{\sqrt{7}}$ (d) $\frac{1}{\sqrt{3}}$

31. If y= $\tan^{-1}\sqrt{\frac{1-cosx}{1+cosx}}$, then $\frac{dy}{dx}$ will be

(a) sin x cos x (b) $\frac{\pi}{2}$

(c) $\frac{1}{2}$ (d) $\frac{1}{1+cos^2x}$

32. The value of $\lim_{x\to 1}(1-x)\cdot\tan\left(\frac{\pi x}{2}\right)$ will be

(a) $\frac{\pi}{2}$ (b) $\frac{2}{\pi}$

(c) 2® (d) ®

33. Let f(x) = $\begin{cases}\frac{x^2-4x+3}{x^2+2x-3}, & x\neq 1\\ k & x=1\end{cases}$ If f(x) is continuous at x=1, then the value of k will be

(a) 1 (b) $\frac{1}{2}$ (c) -1 (d) $-\frac{1}{2}$

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34. The point on the curve $y= 2x^2 -4x+5$, at which the tengent is parallel to x-axis, will be

(a) (1,3) (b) (-1,3)

(c) (1,-3) (d) (-1,-3)

35. The point on $x^2 = 2y$, which is closest to the point (0,5) will be

(a) $(2\sqrt{2}, 0)$ (b) (0,0)

(c) (2,2) (d) None of these

36. The interval, in which the function $f(x) = x^2e^{-x}$ is an increasing function, will be

(a) (-ã,ã) (b) (-2,0)

(c) (2,ã) (d) (0,2)

37. Let $f(x) = \begin{cases} x^n . sin\left(\frac{1}{x}\right), & x \neq 0 \\ 0, & x = 0 \end{cases}$ Then, f(x) is differentiable at x =0, if

(a) n Č (0,1) (b) n Č (1,2)

(c) n Č (1,ã) (d) n Č (-ã, ã)

38. In which interval the function $f(x) = \sqrt{log_{10}\left(\frac{5x-x^2}{4}\right)}$ is defined ?

(a) [1,4] (b) [0,5)

(c) (0,1) (d) (-1, ã)

39. The functioin f(x) = sin x + cos x will be

(a) an even function (b) an odd function

(c) a constant function (d) None of these

40. The value of $\frac{\cos\sqrt{x}}{\sqrt{x}}$ dx will be

(a) $2\sin\sqrt{x} + c$ (b) $2\cos\sqrt{x} + c$

(c) 2sin x + c (d) $\sqrt{2}$sin x + c

41. The valueb of $\int_2^3 \frac{\sqrt{x}}{\sqrt{5-x}+\sqrt{x}}$ dx will be

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{\sqrt{2}}$

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(c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{3}}$

42. The area common to the curves $y^2 = x$ and $x^2 = y$ will be

(a) 1 sq unit (b) $\frac{2}{3}$ sq unit

(c) $\frac{1}{4}$ sq unit (d) $\frac{1}{3}$ sq unit

43. If $x+y \leq 2$; $x \geq 0$; $y \geq 0$, then the point, at which the maximum value of $3x+2y$ is attained, will be

(a) (0,0) (b) $\left(\frac{1}{2}, \frac{1}{2}\right)$

(c) (2,0) (d) (0,2)

44. The maximum value of $p = 6x+8y$, if $2x+y \leq 30$; $x+2y \leq 24$, $x \geq 0, y \geq 0$, will be

(a) 90 (b) 120

(c) 96 (d) 240

45. regression of saving (s) of a family on income y may be expressed as $s = a+\frac{y}{m}$, where a and m are constants. In a random sample of 100 families the variance of saving is one quarter of the variance of incomes and the correlation coefficient is found to be 0.8, the value of m is

(a) 0.8 (b) 1.25

(c) 0.25 (d) None of these

46. The integral $\int_1^{10} x^3$ dx is approximately evaluated by Trapezoidal rule $\int_1^{10} x^3 = 3\left[\frac{1+10^3}{2} + \sim + 7^3\right]$ for n=3, then the value of ~ is

(a) 4^3 (b) 4^2

(c) 5^3 (d) None of these

47. The solution of the equation $\log_7 \log_5(\sqrt{x^2+5}+x) = 0$ is

(a) x = -2 (b) x = 2

(c) x = 4 (d) x =5

48. A balloon is coming down at the arate of 4m/min and its angle of elevation is 45^0 from a point on the ground which has been reduced to 30^0, after 10 min . Balloon will be on the ground at a distance of how many meters from the observer ?

(a) $20\sqrt{3}$ m (b) $20(3+\sqrt{3})$m

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(c) $10(3+\sqrt{3})$m (d) None of these

49. A fair coin is tossed n times. If the probability of getting 7 heads is equal to the probability of getting 9 heads,then the value of n will be

(a) 8 (c) 13

(c) 15 (d) None of these

50. The probabilities of solving a equation by three students are $\frac{1}{2},\frac{1}{4},\frac{1}{6}$ respectively. What is the probability. What is the probability that the equation is solved ?

(a) $\frac{35}{48}$ (b) $\frac{1}{48}$

(c) $\frac{11}{16}$ (d) $\frac{2}{11}$

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